of the bar which first broke proving "that for some length of time, or from perhaps its original manufacture, the weld was imperfect—not more than one-third of the melting surface being united, and the other two-thirds presenting a rusty surface." It has been found that the welding together of different kinds of iron gives an unfavourable result. Welds made with peat are superior to those made with coal, which might be expected, since ligneous carbon, being free from sulphur or pyrites, must be better for the purpose than any fuel containing these impurities.

It is found that vibration, such as railway axles are subject to, and also, which is analogous to it, the operations of hammering, swaging, or planishing iron after it has lost its red-heat and high ductility, have the effect of reducing the fibrous texture of wrought to the crystalline structure of cast-iron (evincing an effort on the part of the metal to return from an artificial to its primal state); thereby causing it to materially deteriorate in quality, and endangering its stability wherever there is any strain to bear: but it is also ascertained, that there is nothing inherently wrong in this cold hammering, &c., for, on the contrary, if it is combined with the curative process of *re-heating and slow cooling*, the tenacity and shock-resisting quality of the iron are even much enhanced. Hence, in the case of iron trusses, for example, when the eyes of the tension and suspension rods are formed and finished, they should be brought again to a red heat, and not afterwards subjected to any percussive process.

In *Newton's Journal* for 1827, is described a method then lately discovered of rendering the hardest cast-iron soft and malleable, so that it may be welded together, or when in a cool state, bent into almost any shape by a hammer or vice; it consists in placing the casting in a pot surrounded by a soft red ore found in Cumberland and other parts of England, and setting the pot in a common oven; the doors of the latter being closed, and but a slight draught of air admitted under the grate, a regular heat is kept up for one or two weeks, according to the thicknesses and weight of the casting; the pot is then withdrawn and suffered to cool. We may imagine that from this discovery very important results might be obtained.

In the contracts of the Admiralty for chain cables for the British navy, it is (or used to be) stipulated that "the iron shall have been manufactured in the best manner from pig-iron, smelted from iron-stone only, and selected of the best quality for the purpose, and shall not have received in any process whatever subsequent to the smelting, the admixture of either the cinder or oxides produced in the manufacture of iron; and shall also have been puddled in the best manner upon iron bottoms, and at least three times sufficiently drawn out at three distinct welding heats, and at least twice properly faggotted."

"When iron once gets rust, so as to form a scale," says Smeaton, "whatever coat of paint or varnish is put on over this, the rust will go on progressively under the paint." Such being the case, it is obvious that all works in iron, whether cast or wrought, should be defended against atmospheric action before it has once cooled; for this there are many methods, but perhaps the best of all is that practised by Smeaton himself, namely, striking the iron over with raw linseed oil when at a blue heat, which fills the pores, and gives it the appearance next day of having received a coat of varnish.

It was the practice of the ancient architects, and of those also of the middle ages, to qualify their design to their materials; and hence we do not find in their works the incongruities that abound in the falsely conceived imitations of our own times. If we examine the candelabra, tripods, chairs, and other similar works of the former, as existing in marble and bronze, we find these objects, destined as they were for the same purposes, though executed in different materials, to exhibit the same general design, and be equally symmetrical, while they materially differ in their proportions and detail. In like manner, if we turn to the works of the latter, we find that it was with them a chief aim to regard the peculiar character of each material, and never, while aiming to surprise, to affect in one the characteristics of another, but, on the contrary, even appreciating the varieties to be found in one material,—as may be seen in their use of slender insulated shafts of Purbeck marble, where a more fragile description of stone, employed in the same proportions, would have had less stability, and would have conveyed also a sense of less safety. With moderns, however, this has been grievously overlooked; and accordingly we find castings of iron arrayed in a tawdry disguise of paint, which soon gets rusty, taking the place of stone, and wearing the stamp of vulgar pretension, where, had it been given its own character, no such mark of deception would have been the result. This proceeds from the primary error of misapprehending the character of the material,—first thinking ourselves called upon to imitate the massive proportions of another which is more friable in its nature, and then perceiving the obstacles to our working by hand that which we have chosen. In the days of the old architects, too, the fashion had not arisen of concealing aught that was necessary or useful; and they made it their business to render subordinate objects of utility as sightly as possible; thus, instead of the mortise-locks and edge-hinges of the present day, those essential articles became in their hands rich and beautiful ornaments—their efficiency running no risk of being impaired from any attempt to render them invisible. The varied and flowing scroll-work of the early hinges, overspreading the surface of massive oaken doors, and the elaborate specimens of smith-craft decorating antique chests and cabinets will occur to the reader, and be contrasted favourably with the bald and stealthy practices of the nineteenth century.

In contemplating the class of ancient works to which we have referred, and encouraging in our minds a sympathy with the spirit in which they were produced, we become alike forcibly impressed with their exceeding beauty and the peculiar capability of the material: reason, however, shews us that although these old examples are all executed in wrought-iron, it does not follow that we who possess an improved knowledge of the physical properties of that material, and can render it in another and more enduring form, are not, when employing it in similar works, to avail ourselves of our superior knowledge. In contending for the use of cast-iron in an ancient style of architecture, when occasion offers, we do not mean to promulgate such an erroneous idea as that of executing in cast-iron, forms which it is obvious are exclusively adapted to wrought; that would be blindly travelling the beaten track of imitation. Let it be conceded that, had the ancient architects possessed cast-iron, they would have made it subservient to their purposes; and in this supposition, let us, in using it, do so in the way they would have done, as far as imagination will assist us, disusing the pincer twists and the rivettings, and any such operations as, in this material, are impossible or no longer necessary. This will, of course, alter the character of the production; but then, the material being another, it is reasonable that its character should be as distinctive as we find those of stone, wood, and wrought-iron invariably to have been; and that where both are employed, they should respectively perform a part peculiarly their own.

But it is in the hands of science, as a material of construction, that iron has in modern times assumed its high importance. Confined no longer to the formation of locks and hinges, it appears in shapes undreamt of by those ancient artists whose clever but limited performances we have been admiring. Instead of the wooden-walls, coming ages will boast of the iron-sides of old England; our pleasant old highways, which wound accommodatingly round hill-sides, and dipped into valleys, and clambered steep uplands, have given place to iron ways, made by engineers—men of straightforward, uncompromising minds, who make our paths straight, and narrow, and level, and gauged—who, tholas-like, bore through wood and stone alike, unflinchingly and insubvertible. Our stage-coaches, too, which whilom carried six insides and twelve out, whirled along by sleek bays, and browns, and dapples, and guided by some spruce genius of the thong, have vanished in the hissing breath of the fiery and panting locomotive, who with muscles, and sinews, and nerves of iron, and a boiling current in his veins, now flies along his track, with the power of squadrons, and the speed of light, bearing a population in his train; our bridges of arched masonry are superseded by ponderous beams or vertebrated slings of iron; we export iron dwellings to our colonies, and have sent an iron church to Jamaica, not omitting its complement of stained glass. In a word, the progress of civilization is due to iron. Just fancy railways across the deserts of Arabia, and through the wilderness of America,—imagine yourself careering along from Albany to Niagara, on a pleasure-trip to see the falls, and the red Indian humbly vending, at the stations, trinkets, baskets, and mocassins, dividing your attention with the smart waiter, who tempts your palate with ices and confectionary. To portray the achievements of iron, as already accomplished, might be easy, but to conceive its latent capabilities is impossible.

HOUGHTON HOUSE, BEDFORDSHIRE,

DESIGNED BY INIGO JONES.

At a meeting of the Freemasons of the Church, held on the 8th ultimo, a paper on Houghton House, by Mr. E. W. Smith, of Bedford, was read, of which the following is the substance:—

The existing structure owes its chief historical interest to the circumstance that it was built by the celebrated Countess of Pembroke, immortalised by Ben Jonson in his justly lauded epitaph.

> "Underneath this marble hearse
> Lies—the subject of all verse—
> Sidney's sister, Pembroke's mother.
> Death—e'er thou hast slain another,
> Fair and good, and learn'd as she,
> Time shall throw a dart at thee!"

But the estate of Houghton was in possession of the family of the *Conquests*, who conferred upon the parish and manor this additional name, and it has since been recognized as Houghton Conquest. The manor was in possession of this family in the thirteenth, and probably in the twelfth century. Sir John Conquest, one of the Bedfordshire knights, served in the army of Henry III. The mansion was called Houghton, or Conquest Bury, and some small remains still exist of it in a farmhouse, but I have not yet had an opportunity to examine them.

The male line of this family became extinct in Benedict Conquest, father of Lady Arundel, and the estate was sold to Lord Ossory's father in 1741.

Houghton, or Dame Ellersbury Park, was in the beginning of James First's reign occupied by Sir Edmund Conquest, as keeper. In 1605 the king, in one of his "progresses," honoured Sir Edmund with a visit, and attended service with all his court at the parish church, which is recorded in a curious MS., written by Dr. Zachary Grey, editor of Hudibras, and since handed down through the successive rectors of the parish; and I am indebted to the kindness of the present incumbent, the Rev. H. J. Rose, both for a sight of the MS., and also for several valuable notices which I shall have occasion to insert in this sketch of Houghton Conquest.

"It appears from certain records in the possession of his grace, the Duke of Bedford, that in the year 1615 Sir Edmund Conquest, lessee under the crown of Houghton Park, made over his interest in it to the Lady Mary Sidney, then a widow, through her trustees, Matthew Lister and Leonard Wolstead.—In 1630 the two estates, united in the Bruce family, were granted by charter to one Ditchfield and others, who conveyed it to Sir Francis Clerke, whose heirs sold it to the Pigots, and they again to the Earl of Aylesbury, in 1675. In 1738 it was purchased of his family by the Duke of Bedford, and from thence passed with Houghton Park into the hands of the Earl of Upper Ossory."

The present house (now in ruins), on a totally different site to the old residence of the Conquests, was built by the celebrated Mary Sidney Herbert, Countess of Pembroke, about the year 1615, or between that year and 1621, when she died. There is little doubt but that Inigo Jones was the architect, both from the evidence of style, and also that he was much patronised by William Earl of Pembroke, son

* See Parry's "Illustrations of Bedfordshire," p. 83.

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